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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,254	11/17/2003	Hai Deng	P17284	6503
59796 7590 03/13/2009 INTEL CORPORATION c/o CPA Global P.O. BOX 52050 MINNEAPOLIS, MN 55402				
EXAMINER				
OLSEN, ALLAN W				
ART UNIT		PAPER NUMBER		
1792				
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03/13/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/716,254

Applicant(s)

DENG, HAI

Examiner

Allan Olsen

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-16, 18-24 and 26-46 is/are pending in the application.
- 4a) Of the above claim(s) 29-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-16, 18-24, 26-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 8, 2008 has been entered and amended by the attached examiner's amendment.

On June 18, 2008, applicant was mailed a notice that their submission of April 8, 2008 was non-compliant. No response to the Notice of Non-compliance has been received. The Notice included the following statements regarding failure to respond.

Failure to timely respond to this notice will result in:

Abandonment of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or

Non-entry of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

The response held non-compliant accompanied a Request for Continued Examination (RCE). This scenario is not addressed in the above statements. Therefore, for the purpose of selecting the appropriate response to applicant's failure to respond, the non-compliant submission is considered to be a preliminary amendment. As such the amendment has not been entered. It is worth noting that the amendment was not substantive with respect to claim limitations.

Response to Arguments

In the Final Office action mailed October 10, 2007, the examiner stated that applicant's July 26, 2007 arguments were persuasive with respect to the prior art and the prior art rejections were withdrawn. After reviewing the prosecution history and the applied prior art the examiner now believes the claims to be rejectable over the previously applied prior art.

Applicant had argued that their claimed invention was distinguished over Ogihara because the via and trench are etched into a wet gel-zeolite composite whereas Ogihara teaches that the thin films used as the porous dielectric layer are prepared by heating the zeolite-sol composite for several minutes at 50°- 150°C in a drying process in an attempt to remove the solvent.

The examiner notes that applicant's specification indicates that the claimed wet gel - zeolite composite may comprise a material in which almost all of the liquid may be extracted to form a wet gel that is closer to a solid phase transition having different mechanical properties.

It is noted that the relatively mild heating conditions of Ogihara (i.e., 50°C for several minutes) are quite similar to the conditions disclosed in applicant's specification. Furthermore, it is not disclosed that Ogihara completely removes the solvent. Ogihara's attempt to remove the solvent clearly removes some perhaps a lot of solvent but it is not expected that the mild conditions taught by Ogihara could actually remove all of the solvent from the sol-gels taught by Ogihara. As such, the previously applied prior art rejections are reinstated and set forth below.

Applicant's arguments regarding the rejection under 35 USC 112 1st paragraph are persuasive and that rejection has been withdrawn.

Election/Restrictions

Claims 29-46 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on March 16, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 6, 8, 9, 11 and 15, 16, 18-24, 26 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ogihara's et al. US Patent Application Publication 2004/0091419 (hereinafter, Ogihara).

Ogihara teaches creating a colloidal zeolite-sol. Ogihara teaches the sol may comprise up to 30 parts by weight of zeolite to 1 part of silane. Ogihara teaches spin coating the zeolite -sol onto a semiconductor substrate. Ogihara teaches treating the

sol under the same conditions that applicant teaches. For example, Ogihara and applicant both dry the zeolite material, by heating under the same conditions, which results in: oxidizing the zeolite-sol; forming a gel-zeolite composite; calcining the gel zeolite-composite; forming an aerogel-zeolite composite. Ogihara teaches the zeolite-sol comprises silica. Ogihara teaches the sol comprises an alcohol such as methanol, ethanol and propanol. Ogihara teaches the sol comprises HCl. Ogihara teaches the sol comprises TEOS. See paragraphs: [0032], [0035], [0037], [0055], [0076], [0078], [0089], [0101], [0112] and [0126].

Regarding the requirement that the contact hole and trench be etched into a wet sol-gel, the examiner notes that when a reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention but has basis for shifting the burden of proof to applicant, a 102/103 rejection in the alternative is appropriate, as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980). See MPEP §§ 2112- 2112.02.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogihara.

Ogihara does not teach using vacuum conditions to dry the zeolite material.

It would have been obvious to one skilled in the art to dry the zeolite material of Ogihara under reduced pressure condition because this is well known and widely used means of controlling the rate of drying.

Claims 12-14 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogihara in view of US Patent 6,808,867 issued to Doshi et al. (hereinafter, Doshi).

Ogihara does not teach the temporal relationship between the patterning and calcination of the gel-zeolite composite. Ogihara does not teach dip-coating the zeolite-sol.

Doshi teaches a method wherein sol gel layers are patterned before they undergo calcination (column 9, lines 56-58). Doshi teaches dip-coating of sol-gels (column 8, lines 28-29).

It would have been obvious to one skilled in the art to incorporate Doshi's methodology when using Ogihara's method to form a porous low k dielectric layer, and thereby pattern Ogihara's gel-zeolite composite before it undergoes calcination, because Doshi's method incorporates photolithographic properties into the sol-gel layer itself thereby eliminating all the steps that would be associated with providing and patterning an overlying photoresist layer.

It would have been obvious to dip-coat Ogihara's zeolite-sol because Ogihara teaches spin coating and Doshi teaches that dip-coating and spin-coating are functionally equivalent with respect to the formation of sol-gel thin films.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogihara in view of Martin's US Patent Application Publication 2002/0197645 (hereinafter, Martin).

Ogihara does not teach dip-coating the zeolite-sol.

Martin teaches methods of coating layers of zeolite material on substrates (see [0217] and [0223]).

It would have been obvious to one skilled in the art to dip-coat the zeolite sol of Ogihara because Ogihara teaches spin coating and Martin teaches that dip-coating and spin-coating are functionally equivalent methods of depositing zeolite materials.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allan Olsen/
Primary Examiner, Art Unit 1792